VASCULAR FLORA OF SUBALPINE PARKS IN THE COEUR D'ALENE RIVER DRAINAGE, NORTHERN IDAHO

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ABSTRACT

Treeless summits and ridges in the otherwise densely forested mountains of northern Idaho have a distinctive flora compared with surrounding areas. Although small in size, these subalpine parks add greatly to the biotic diversity of the regional landscape and are habitats for several plant species considered rare in Idaho. I conducted a floristic inventory of 32 parks in the mountains of the Coeur d'Alene River drainage and adjacent portions of the St. Joe drainage. The subalpine park flora contains 151 taxa representing 97 genera in 34 families. *Carex* species are surprisingly depauperate in terms of both number and cover as is the alien flora with only four species. I discovered populations of five rare plants, including *Carex xerantica*, which is here reported for Idaho for the first time. The other species considered rare in the state are *Astragalus bourgovii*, *Carex californica*, *Ivesia tweedyi*, and *Romanzoffia sitchensis*. Stevens Peak (2084 m) is the highest summit and is phytogeographically unique. It contains habitat for six species occurring nowhere else in the study area, all having high-elevation cordilleran or circumboreal affinities.

Treeless summits and ridges in the otherwise densely forested mountains of northern Idaho, have a distinctive flora compared with surrounding areas. Although small in size, these subalpine parks or balds add greatly to the biotic diversity of the regional landscape. The origin of subalpine parks was hypothesized to be a result of repeated fires (Leiberg 1897, Larson 1926) but was later shown to result from a combination of low soil moisture on slopes exposed to the wind and heavy snow accumulation on leeward slopes (Daubenmire 1944; 1968; 1981; Root and Habeck 1972). Conditions created by this interplay of topography and snow transfer are too extreme for tree seedlings to survive (Daubenmire 1981).

Floristic studies of subalpine parks in northern Idaho in general and the Coeur d'Alene River drainage in particular are sparse. The early explorations of John Leiberg (1897) and John Christ were the first to elucidate the floristic and ecologic composition of parks in the Coeur d'Alene drainage. Daubenmire (1981) described the flora of five parks between the Canadian border and the Salmon River, including one in the Coeur d'Alene drainage. These and other collectors elucidated the phytogeographic significance of subalpine parks in the area and discovered several plants with limited distribution in Idaho. Because of increasing recreational use of the north-

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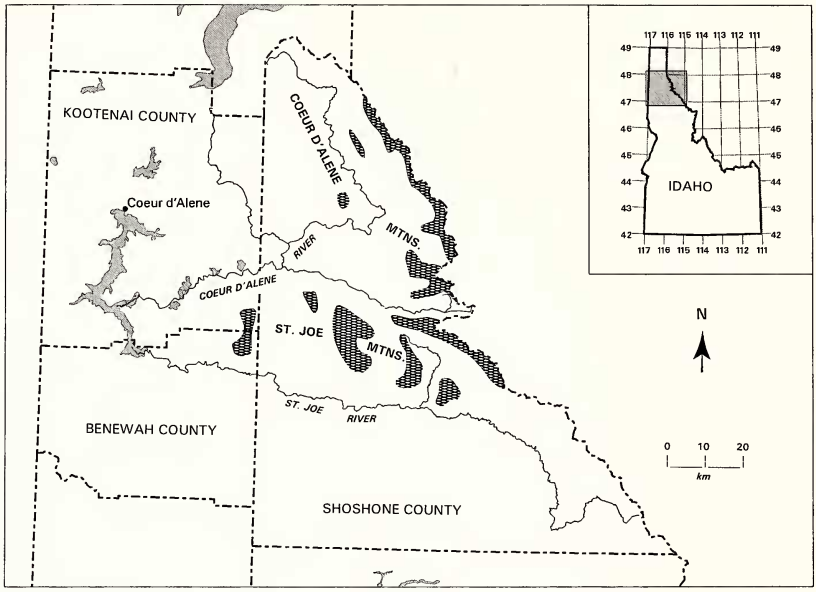

FIG. 1. Location map of the study area. Dark shading represents the general location of terrain above 1800 m where subalpine parklands in the Coeur d'Alene River drainage occur. Light shading represents lowland lakes.

ern Idaho mountains, the sensitivity of the habitat, and the preliminary nature of the floristic inventory, I undertook this study in cooperation with the Idaho Panhandle National Forests. It provides data on floristic composition and the distribution and abundance of rare plants in subalpine parks for future management.

STUDY AREA

The study area includes treeless parks above 1800 m within the Coeur d'Alene River drainage and the northern fringe of the St. Joe River drainage in Benewah, Kootenai, and Shoshone counties (Fig. 1). Stevens Peak, at 2084 m, is the highest summit. The mountains of central and northern Idaho form a nearly continuous massif. Mountains north of the Salmon River have generally been called the Bitterroot Range, with indistinct subranges named after major river drainages. In the study area, the high divide between the St. Joe and Coeur d'Alene rivers is called the St. Joe Mountains by the U.S. Geological Survey. The name Coeur D'Alene Mountains has been broadly used in the past in reference to highlands of northern Idaho that drain into Coeur d'Alene Lake (Leiberg 1897; Dort 1962), although it now appears to be more narrowly applied to mountains of the Coeur d'Alene River drainage north of its South

TABLE 1. CLIMATIC RECORDS FOR DECEPTION CREEK HQ, IDAHO, ELEVATION 933 M, 1931–1980.

	Temperature (°C)	Precipitation (mm)
Mean annual	5.5	1418
Mean October–May	1.0	1217
Mean June–September	14.9	201

Fork. I follow the latter naming convention. Latour Range and Shoshone Range are names applied to prominent mountain crests within the St. Joe and Coeur d'Alene mountains, respectively.

The area is underlain by metasedimentary rocks of the Belt Supergroup of Precambrian age. The thickness of the Belt Supergroup is estimated to be at least 6400 m and is comprised predominantly of quartzite and argillite, with minor amounts of limestone and dolomite (Bennett et al. 1989). Ridgecrests do not greatly exceed the minimum elevation necessary for formation of alpine glaciers during the Pleistocene (Dort 1962). The glaciers that did develop were relatively small, confined to the north sides of ridges and summits, resulting in relatively gentle slopes on south aspects and steep headwalls on the north.

Climate of the Coeur d'Alene River drainage is influenced primarily by prevailing westerlies which carry maritime air masses from the Pacific Ocean across the Northern Rockies during the winter and spring. This inland maritime regime extends from the Selkirk Range in British Columbia to the Clearwater River drainage in north-central Idaho. During winter and spring the inland maritime regime is characterized by gentle rains, deep snow accumulations at higher elevations, and abundant fog, cloudiness, and high humidity. Winter temperatures are 8 to 14°C warmer than continental locations at similar latitudes. Summers are relatively dry due to subtropical high pressure systems shifting northward in late June, causing the prevailing westerlies to carry dry air across northern Idaho (Ross and Savage 1967; Cooper et al. 1991).

The climate is not expressed well by any existing records, however, data from the Deception Creek HQ weather station (Finklin and Fischer 1987), located 25 km east of Coeur d'Alene at the western edge of the study area and approximately 850 m below the subalpine parks, gives an indication of climatic trends (Table 1). Temperatures in the subalpine parks are lower and precipitation is approximately 10% higher than at Deception Creek HQ. Snowpack average at 1469 m on April 1 is 183 cm (Finklin and Fischer 1987).

Dense, mixed coniferous forests cover much of the mountains in the Coeur d'Alene River drainage. *Pinus ponderosa* and *Pseudotsuga menziesii* dominate the dryer, lower elevation slopes, while *Thuja*

plicata, *Tsuga heterophylla*, *Larix occidentalis*, *Pinus monticola*, and *Abies grandis* comprise much of the forest cover at middle elevations. Upper elevation forests surrounding subalpine parks are comprised of communities dominated by *Tsuga mertensiana*, *Abies bifolia*, and *Pinus albicaulis*. *Pinus albicaulis* is represented largely by standing dead trees, as few individuals have survived the invasion of white pine blister rust (Arno and Hoff 1989). Forests at all elevations are in various stages of successional development following large wildfires of the late 1800's and early 1900's, and over a century of large-scale mining and smelting activity (Rabe and Flaherty 1974). Currently, livestock grazing does not take place in and around subalpine parks of the Coeur d'Alene drainage and, according to Leiberg (1897), was largely absent in the past.

Plant Communities of Subalpine Parks

Although Daubenmire was able to classify forest and steppe vegetation of the region (Daubenmire and Daubenmire 1968; Daubenmire 1970), he discontinued phytosociologic studies in subalpine parks due largely to the small-scale patterns of plant composition and dominance (Daubenmire 1981). He did, however, partition parks into two broad types, xerophytic parks on the windward slopes of ridges and summits, and snowbank parks on the lee sides. Using this classification as a basis, I recognize three types of plant habitats or communities.

Graminoid. This roughly corresponds to Daubenmire's (1981) xerophytic park. It is dominated by graminoids, largely *Festuca viridula*, but also with high cover of *Xerophyllum tenax* and *Carex geyeri* in some areas. Unlike xerophytic parks described by Daubenmire (1981), however, I found *Festuca idahoensis* and *Agropyron spicatum* to be rare. There is a high diversity, albeit low cover of forbs. Shrub cover is low and trees generally occur as scattered clumps or islands. Graminoid parks occur on southerly slopes and are exposed to prevailing winds, making them zones of snow deflation. In contrast, treeless parks occurring on south slopes in the montane zone, below about 1370 m, are dominated by *Festuca idahoensis* and *Agropyron spicatum* and lack *Festuca viridula*. These lower-elevation habitats appear to represent Daubenmire's typical xerophytic park.

Cliffs and ledges. This habitat roughly corresponds to Daubenmire's (1981) snowbank park, because it occurs on the lee sides of summits and ridges. However, unlike his sites, which had relatively gentle slopes, these northerly-facing habitats occur on steep, cirque headwalls and have considerable areas of exposed bedrock. Cliffs and ledges are generally zones of snow deposition, although in a

few places they are exposed to prevailing winds throughout the year and are relatively xeric. *Penstemon fruticosus* and *Saxifraga* spp. are characteristic of this habitat.

Talus. Talus slopes occupy only a small portion of the area, but have a distinctive flora. Talus can occur within both the graminoid community on south slopes and at the base of cliffs and ledges on north slopes (Daubenmire and Skipp 1943). This habitat is comprised of stabilized blocks of argillite or quartzite, up to 4 dm in diameter, with little soil development between the blocks. *Calamagrostis purpurascens* and *Penstemon fruticosus* are characteristic here.

Methods

The checklist is based largely on field observations and collections that I made in 32 subalpine parks in the Coeur d'Alene River drainage between 1986 and 1993. All specimens are deposited at the University of Idaho Herbarium (ID). Other collections examined include those of John Leiberg, John Christ, W.R. Moore, Steven Brunsfeld, and Charles Wellner at ID and WS. Identification of certain *Carex* specimens were provided by J. Mastrogiuseppe and M. Hurd. Following field work, three geographic abundance classes were assigned to each taxon based on the number of subalpine parks where it was present, as follows: *common*, 16 or more parks; *uncommon*, 6 to 15 parks; *rare*, 5 or fewer parks. Range-extension information for the species new to Idaho was determined from herbarium records. The Idaho Conservation Data Center database was consulted concerning the current distribution of rare species in Idaho.

Results and Discussion

The vascular flora of subalpine parks in the Coeur d'Alene River drainage consists of 151 taxa representing 97 genera in 34 families of vascular plants. Only four alien species, *Centaurea maculosa*, *Rumex acetosella*, *Taraxacum officinale*, and *Trifolium repens*, were encountered. This group comprises 3% of the flora. All are rare, occurring only along roads and near electronic sites. *Carex* species are surprisingly depauperate in terms of both numbers and cover. Of the ten encountered, only *Carex geyeri* is common. Their scarcity can be attributed to the lack of late-lying snowbanks, the usual habitat for ridgeline sedges in northern Idaho. Because of the relatively low elevation of the area, few snowbanks last through an ordinary summer and fall, except in the couloirs on Stevens Peak.

My collection of *Carex xerantica* represents the first documented occurrence of this species in Idaho. Four additional species have a limited distribution and are considered rare in the state: *Astragalus bourgovii*, *Carex californica*, *Ivesia tweedyi*, and *Romanzoffia sitch-*

ensis (Conservation Data Center 1994). All five rare species have either low population levels or occupy very localized habitats in the study area, but none appear to be imminently threatened by anthropogenic disturbances. Management for their viability should be emphasized, however, and they should be periodically monitored by forest managers to assure their continued existence.

Carex xerantica. This species is distributed across the northern and central Great Plains and the high plateaus of central and southern Utah and northern Arizona (Hermann 1970). I collected it in two areas of Idaho during 1993. Two small populations were discovered on Latour Peak and nearby Mount Wiessner, Kootenai County. I discovered a second site on Mount Harrison, Cassia County, ca. 700 km south of the study area (*Moseley 2847* BOIS). The Kootenai County sites are perhaps 200 km west of the nearest known populations in Montana (*Kirkwood 1031*, *Barkley 2377*, *Addor 141* all MONTU) and the Cassia County population is ca. 350 km northwest of those in Utah.

Astragalus bourgovii. Endemic to the Rocky Mountains of western Montana and adjacent areas of British Columbia and Alberta, *Astragalus bourgovii* is at the western edge of its range in Idaho (Barneby 1964), where it is represented by two populations in the study area. John Leiberg discovered the first population on Stevens Peak in 1895, and I located only one additional population on an unnamed summit 3.2 km to the east. It occurs in windswept areas of the graminoid community and on dry, ridgeline ledges.

Carex californica. Idaho populations of *Carex californica* represent disjunct locations for this otherwise Cascadian species (Hermann 1970). Five Idaho populations are known, one from the study area on the summit of Striped Peak, Shoshone County, and four from Idaho County, ca. 110 km to the south (unpublished data on file at the Idaho Conservation Data Center). The small clone on Striped Peak occurs in a graminoid community dominated by *Festuca viridula.*

Ivesia tweedyi. Another disjunct species in the mountains of northern Idaho, *Ivesia tweedyi* is also mainly a Cascadian species from Chelan and Yakima counties, central Washington. It is known from eleven populations in Idaho, with five occurring in the southeastern portion of the area (unpublished data on file at the Idaho Conservation Data Center). It occurs on exposed, rocky ridgecrests and steep, dry slopes.

Romanzoffia sitchensis. This delicate member of the Hydrophyllaceae is a cordilleran species ranging from southern Alaska to northern California, and inland to Alberta (Hitchcock and Cronquist 1973). Six small populations are known from Idaho (unpublished

data on file at the Idaho Conservation Data Center), five of them from the Selkirk Mountains near the Canadian border, Boundary County, and one in the study area in Shoshone County. The study area population on Stevens Peak is disjunct ca. 160 km south of the Selkirk populations.

Results of my floristic inventory indicate that Stevens Peak occupies a unique phytogeographic position in the study area. I found that six species occur only on this summit: *Astragalus bourgovii*, *Draba lonchocarpa*, *Oxyria digyna*, *Romanzoffia sitchensis*, *Sedum roseum*, and *Smelowskia calycina*. All are high-elevation cordilleran taxa, some having circumboreal distributions. Stevens Peak is the highest summit and is one of the most heavily glaciated. The large headwall on the north face, incised by several couloirs, is where most of the unusual species occur. In addition, a large population of *Ivesia tweedyi* occurs on the peak.

Annotated Checklist of Vascular Plants

The checklist is arranged by division and class (in Anthophyta), then alphabetically by family and species within these major groups. Nomenclature generally follows Hitchcock and Cronquist (1973). Exceptions include Lycophyta, Pterophyta, and Coniferophyta (Flora of North America Editorial Committee 1993) and *Poa* (Arnow 1987). Unless otherwise noted, the collection numbers are the author's, which are deposited at ID.

Division Lycophyta

Selaginellaceae

Selaginella scopulorum Maxon. Common on dry ledges and cliffs in graminoid community; *2715*.

Division Pterophyta

Pteridaceae

Cheilanthes gracillima D.C. Eaton. Common on dry cliffs and ledges; *2689*.
Cryptogramma acrostichoides R. Br. Common in talus and on cliffs and ledges; *2693*.

Dryopteridaceae

Athyrium alpestre (Hoope) Clairville var. *americanum* Butters. Rare in talus; *2776*.
Cystopteris fragilis (L.) Bernh. Common on cliffs and ledges; *2694*.
Polystichum lonchitis (L.) Roth. Uncommon on moist cliffs and ledges; *2716*.
Woodsia scopulina D.C. Eaton. Uncommon on cliffs and ledges; *2731*.

Division Coniferophyta

Cupressaceae

Juniperus communis L. var. *depressa* Pursh. Uncommon on ledges and in talus; *2662*.

Pinaceae

Abies bifolia A. Murray. Common treeline species. No voucher.
Pinus albicaulis Engelm. Common treeline species along eastern edge of study area. Largely absent from peaks in western portion. No voucher.
Pinus contorta Dougl. var. *latifolia* Engelm. Rare in graminoid community. No voucher.
Pinus monticola Dougl. Rare in graminoid community. No voucher.
Pseudotsuga menziesii (Mirbel) Franco var. *glauca* (Mayr) Franco. Rare in south-facing graminoid community. No voucher.
Tsuga mertensiana (Bong.) Carr. Common treeline species. No voucher.

Division Magnoliophyta

Class Magnoliopsida

Apiaceae

Angelica dawsonii Wats. Rare on moist ledges; *2740*, *2754*.
Angelica genuflexa Nutt. Rare on moist ledge only on Quarles Peak; *2741*.
Lomatium dissectum (Nutt.) Math. & Const. var. *multifidum* (Nutt.) Math. & Const. Rare in graminoid community; *2674*.
Lomatium sandbergii Coult. & Rose. Common in graminoid community and on ledges; *1265*, *2673*.
Lomatium triternatum (Pursh) Coult. & Rose var. *triternatum*. Rare, found only in graminoid community on Kellogg Peak; *2761*.

Asteraceae

Achillea millefolium L. ssp. *lanulosa* (Nutt.) Piper var. *lanulosa*. Common in all habitats; *2648*, *Wellner 674* (ID).
Agoseris aurantiaca (Hook.) Greene var. *aurantiaca*. Common in graminoid community; *2679*, *Wellner 672* (ID).
Anaphalis margaritacea (L.) Benth. & Hook. Rare in graminoid community; *2681*.
Antennaria alpina (L.) Gaertner var. *media* (Greene) Jepson. Uncommon on moist ledges; *2764*.
Antennaria microphylla Rydb. Common in graminoid community; *1273*, *2653*.
Antennaria racemosa Hook. Uncommon in moist graminoid community and on ledges; *2706*.
Antennaria umbrinella Rydb. Common in graminoid community and on ledges; *2530*, *2685*.
Arnica latifolia Bong. var. *gracilis* (Rydb.) Crong. Common in talus and on ledges; *1266*, *2645*, *2721*.
Arnica rydbergii Greene. Rare in graminoid community; found only on an unnamed summit along eastern edge of study area; *2718*.
Aster foliaceus Lindl. var. *lyallii* (Gray) Cronq. Common in graminoid community; *2845*.
Centaurea maculosa Lam. Rare in graminoid community; only one vegetative rosette was observed on a mining road. No voucher.
Erigeron acris L. var. *debilis* Gray. Uncommon on cliffs and ledges; *2649*.
Erigeron compositus Pursh var. *glabratus* Macoun. Common on dry ledges; *2711*, *2752*.
Erigeron peregrinus (Pursh) Greene ssp. *callianthemus* (Greene) Cronq. var. *eucallianthemus* (Greene) Cronq. Uncommon on moist ledges; *2668*, *2833*.
Hieracium albertinum Farr. Common in graminoid community; *2768*, *2836*, *Wellner 678* (ID).

Hieracium gracile Hook. Common in graminoid community and on ledges; *2684*.
Microseris nigrescens Henderson. Rare in graminoid community; *2646*.
Microseris nutans (Geyer) Schultz-Bip. Rare, found only on Rochat Peak; *1272*.
Senecio integerrimus Nutt. var. *exaltatus* (Nutt.) Cronq. Uncommon in graminoid community; *2725*.
Senecio megacephalus Nutt. Common in graminoid community; *2536*, *2660*, *2765*.
Senecio triangularis Hook. var. *triangularis*. Rare on moist ledges. No voucher.
Solidago multiradiata Ait. var. *scopulorum* Gray. Uncommon in graminoid community; *2831*.
Taraxacum officinale Weber. Alien. Rare in graminoid community; *2739*.

Boraginaceae

Mertensia paniculata (Ait.) G.Don. var. *borealis* (Macbr.) L.O. Williams. Uncommon on moist ledges; *2743*.

Brassicaceae

Arabis holboellii Hornem. Common in graminoid community; *2691*.
Arabis nuttallii Robins. Common in all habitats; *699*, *1270*, *2531*, *2643*.
Draba lonchocarpa Rydb. var. *lonchocarpa*. Rare, found only on the north face of Stevens Peak; *2534*.
Draba oligosperma Hook. var. *oligosperma*. Rare on dry cliffs and ledges; *2842*.
Draba stenoloba Ledeb. Rare, found only in graminoid community on Pond Peak; *Wellner 541* (ID).
Erysimum asperum (Nutt.) DC. Common in talus and on dry ledges; *2729*.
Smelowskia calycina C.A. Mey. var. *americana* (Regel & Herder) Drury & Rollins. Rare, found only on the north face of Stevens Peak; *2529*, *2832*.
Thlaspi fendleri Gray var. *glaucum* (A.Nels.) C.L.Hitchc. Common in graminoid community; *2641*.

Campanulaceae

Campanula rotundifolia L. Common in moist graminoid community; *2841*.

Caprifoliaceae

Lonicera utahensis Wats. Uncommon in graminoid community; *2647*.

Caryophyllaceae

Arenaria aculeata Wats. Common in graminoid community; *2651*, *2770*.
Arenaria capillaris Poir. Uncommon in graminoid community; *704*, *1271*, *Wellner 673* (ID).
Arenaria congesta Nutt. var. *congesta*. Uncommon in graminoid community; *2830*.
Cerastium arvense L. Uncommon on moist cliffs and ledges; *2537*, *2838*.
Silene douglasii Hook. var. *douglasii*. Common on dry ledges; *2775*.
Silene scouleri Hook. var. *scouleri*. Uncommon in graminoid community; *710*, *2676*, *2837*, *Wellner 680* (ID).

Crassulaceae

Sedum lanceolatum Torr. var. *lanceolatum*. Common in all habitats; *2692*.
Sedum roseum (L.) Scop. Rare, found only on the north face of Stevens Peak; *2527*.

Ericaceae

Phyllodoce empetriformis (Sweet) D.Don. Uncommon in graminoid community and on ledges; *2657*.
Vaccinium membranaceum Dougl. Common in graminoid community; *2699*.
Vaccinium scoparium Leiberg. Uncommon in graminoid community; *2658*.

Fabaceae

Astragalus bourgovii Gray. Rare, found only in graminoid community and on dry ledges in the vicinity of Stevens Peak; *2525*, *2757*, *Leiberg 1470* (NY).
Hedysarum boreale Dougl. var. *boreale*. Common in all habitats; *2702*, *2719*.
Lupinus polyphyllus Lindl. var. *burkei* (Wats.) C.L.Hitchc. Uncommon in graminoid community; *2682*.
Trifolium repens L. Alien. Rare along roads in graminoid community; *2771*.

Gentianaceae

Gentiana affinis Griseb. Common in graminoid community; *2844*.
Gentiana calycosa Griseb. Uncommon on moist ledges; *2755*.

Grossulariaceae

Ribes lacustre (Pers.) Poir. Uncommon on moist cliffs and ledges; *2717*.

Hydrophyllaceae

Phacelia heterophylla Pursh var. *heterophylla*. Rare in talus; *2760*.
Romanzoffia sitchensis Bong. Rare, found only on the north face of Stevens Peak; *2528*; *Leiberg 1461* (NY). Leiberg's collection is the type for *R. leibergii* Greene, a synonym.

Hypericaceae

Hypericum formosum Kunth var. *nortoniae* (Jones) C.L.Hitchc. Common in graminoid community and on cliffs and ledges; *2762*.

Onagraceae

Epilobium angustifolium L. Uncommon in talus; *2703*.

Polemoniaceae

Phlox diffusa Benth. Common in graminoid community only along southern periphery of study area; *2726*.
Phlox speciosa Pursh. Rare, found only in continuous graminoid community on Sunset and Goose peaks; *2769*, *Christ 51-357* (ID). This is an odd high-elevation population of an otherwise low-elevation steppe and woodland species.
Polemonium pulcherrimum Hook. var. *calycinum* (Eastw.) Brandegee. Common on cliffs and ledges; *2675*.

Polygonaceae

Eriogonum flavum Nutt. var. *piperi* (Greene) Jones. Common in talus and uncommon in graminoid community; *2654*, *Wellner 675* (ID).
Eriogonum heracleoides Nutt. var. *minus* Benth. Uncommon in talus and graminoid community; *2655*.
Eriogonum ovalifolium Nutt. var. *nivale* (Canby) Jones. Rare on dry ledges; *2744*, *2839*.
Eriogonum umbellatum Torr. Uncommon in graminoid community. No voucher.
Oxyria digyna (L.) Hill. Rare, found only on the north face of Stevens Peak; *2538*.
Polygonum bistortoides Pursh. Common in moist graminoid community; *2736*, *Wellner 538* (ID).
Polygonum phytolaccaefolium Meisn. Common in graminoid community; *2700*.
Rumex acetosella L. Alien. Rare along mining roads in graminoid community; *2680*.

Portulacaceae

Claytonia lanceolata Pursh var. *lanceolata*. Common in graminoid community and on ledges; *2687*.
Montia parvifolia (Moc.) Greene var. *parvifolia*. Common on moist cliffs and ledges; *2535*, *2690*, *2706*.

Primulaceae

Dodecatheon pulchellum (Raf.) Merr. var. *watsonii* (Tidestr.) C.L. Hitchc. Uncommon in graminoid community and on ledges; *2686*.

Ranunculaceae

Anemone multifida Poir. var. *multifida*. Uncommon in graminoid community; *2846*.
Aquilegia flavescens Wats. Uncommon in moist graminoid community; *2738*.
Clematis columbiana (Nutt.) Torrey & Gray var. *columbiana*. Rare on moist ledges; *2756*.
Ranunculus eschscholtzii Schlecht. var. *suksdorfii* (Gray) L. Benson. Uncommon on ledges; *2710*.

Rosaceae

Amelanchier alnifolia Nutt. var. *alnifolia*. Rare in graminoid community; *2774*.
Ivesia tweedyi Rydb. Rare in graminoid community and on dry ledges only in southeastern portion of study area; *2526*, *2720*, *2751*, *Christ 51-479* (ID), *Moore 486* (WS).
Potentilla diversifolia Lehm. var. *diversifolia*. Uncommon in moist graminoid community; *2835*.
Potentilla glandulosa Lindl. var. *pseudorupestris* (Rydb.) Breitung. Common on dry ledges; *705*, *2714*.
Rubus idaeus L. var. *gracilipes* Jones. Rare in talus; *2704*.
Sorbus scopulina Greene var. *scopulina*. Rare in graminoid community; *2773*.
Spiraea densiflora Nutt. Uncommon in talus; *2667*.

Saxifragaceae

Heuchera cylindrica Dougl. var. *glabella* (Torrey & Gray) Wheelock. Common on cliffs and ledges, uncommon in graminoid community and talus; *1274*, *2656*.

Heuchera grossulariifolia Rydb. Rare, found only on cliffs and ledges on Ulm Peak; *706*.
Lithophragma bulbifera Rydb. Rare in dry graminoid community; *2695*.
Mitella breweri Gray. Uncommon on moist cliffs and ledges; *2777*.
Saxifraga bronchialis L. var. *austromontana* (Wieg.) Jones. Common on cliffs and ledges; *2688*.
Saxifraga ferruginea Grah. var. *macounii* Engl. & Irm. Common on cliffs and ledges; *2697*, *2733*.
Saxifraga mertensiana Bong. Common on ledges; *2532*, *2696*, *2732*.
Saxifraga occidentalis Wats. var. *occidentalis*. Common in graminoid community; *2698*, *2734*.

Scrophulariaceae

Castilleja longispica A. Nels. Rare, found only on Shefoot Mountain at southern edge of area; *2724*.
Castilleja miniata Dougl. var. *miniata*. Common in graminoid community and on ledges; *702*, *2701*.
Pedicularis bracteosa Benth. var. *latifolia* (Pennel) Cronq. Rare on moist ledges; *2735*.
Pedicularis contorta Benth. var. *contorta*. Common in graminoid community and on ledges; *2670*, *Wellner 679* (ID).
Penstemon attenuatus Dougl. var. *attenuatus*. Common in talus; *708*, *2642*, *2759*.
Penstemon fruticosus (Pursh) Greene var. *fruticosus*. Common in all habitats; *701*, *1267*, *2663*, *Wellner 539* (ID).
Penstemon lyallii Gray. Uncommon on dry ledges; *707*, *2727*.
Synthyris missurica (Raf.) Pennell. Rare, found only on Kellogg Peak in graminoid community; *2758*.
Veronica cusickii Gray. Uncommon on moist ledges. 2779.

Valerianaceae

Valeriana sitchensis Bong. Uncommon in moist graminoid community; *2737*, *Wellner 540* (ID).

Violaceae

Viola adunca J.E.Sm. var. *bellidifolia* (Greene) Harrington. Uncommon in moist graminoid community; *1268*.

Class Liliopsida

Cyperaceae

Carex californica Bailey. Rare, found in graminoid community only on Striped Peak; *2669*, *Christ 51-419*, *51-393* (WTU).
Carex geyeri F.Boott. Common in graminoid community, *2661*, *2730*.
Carex hoodii F.Boott. Uncommon in moist graminoid community; *2742*.
Carex microptera Mack. Rare in graminoid community; *2728*.
Carex nigricans C.A.Mey. Uncommon in moist graminoid community; *2772*.
Carex pachystachya Cham. Uncommon in moist graminoid community; *2840*.
Carex paysonis Clokey. Uncommon in graminoid community; *2763*.
Carex phaeocephala Piper. Uncommon in graminoid community; *2707, 2766*.
Carex rossii F.Boott. Uncommon in graminoid community; *2671*.

Carex xerantica Bailey. Rare, found in graminoid community only on Latour Peak and nearby Mount Wiessner; *2778*.

Juncaceae

Juncus drummondii E.Mey. Common in moist graminoid community. No voucher.
Luzula hitchcockii Hamet-Ahti. Uncommon in graminoid community; *2658*.
Luzula spicata (L.) DC. Uncommon on ledges; *2709*.

Liliaceae

Allium fibrillum Jones. Rare in graminoid community; *2683*.
Calochortus apiculatus Baker. Common in graminoid community; *703*, *1269*, *2644*.
Erythronium grandiflorum Pursh var. *grandiflorum*. Common in graminoid community and on ledges; *2652*.
Stenanthium occidentale Gray. Common on moist cliffs and ledges; *2713*.
Xerophyllum tenax (Pursh) Nutt. Common in graminoid community; *2705*.

Poaceae

Agropyron caninum (L.) Beauv. ssp. *majus* (Vasey) C.L.Hitchc. var. *andinum* (Scribn. & Sm.) C.L.Hitchc. Uncommon in moist graminoid community; *2745*.
Agropyron caninum (L.) Beauv. ssp. *majus* (Vasey) C.L.Hitchc. var. *latiglume* (Scribn. & Sm.) C.L.Hitchc. Uncommon in graminoid community; *2234*.
Agropyron spicatum (Pursh) Scribn. & Sm. Rare in graminoid community; *2677*.
Bromus carinatus Hooker & Arnott. Uncommon in moist graminoid community; *2743*.
Calamagrostis purpurascens R.Br. Uncommon in graminoid community and common in talus; *709*, *2650*.
Danthonia intermedia Vasey. Uncommon in graminoid community; *2722*.
Festuca idahoensis Elmer. Rare in graminoid community. No voucher.
Festuca viridula Vasey. Common in graminoid community; *2665*, *2723*, *Wellner 537*, *677* (ID).
Oryzopsis exigua Thurber. Uncommon on dry ledges; *2712*.
Poa alpina L. Rare on moist ledges; *2843*.
Poa fendleriana (Steudel) Vasey. Uncommon in graminoid community; *2666*, *2767*.
Poa glauca Vahl var. *glauca*. Uncommon in talus and on ledges; *2672*.
Poa secunda Presl. Uncommon in graminoid community; *2664*.
Trisetum spicatum (L.) Richter. Common on ledges and in talus; *2678*.

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